CHAPTER 6.
Utilization and Disparity Analysis

Keen Independent's utilization analysis reports the percentage of ADOT transportation contract dollars going to minority- and women-owned firms. The disparity analysis compares that utilization with the participation of minority- and women-owned firms that might be expected based on the availability analysis. (Chapter 5 and Appendix D explain the availability analysis.)

Chapter 6 presents results of the utilization and disparity analysis in four parts:

A. Overview of the utilization analysis;
B. Overall MBE/WBE and DBE utilization on ADOT contracts;
C. Utilization by racial, ethnic and gender group;
D. Disparity analysis for ADOT contracts; and
E. Statistical significance of disparity analysis results.

A. Overview of the Utilization Analysis

Keen Independent examined the participation of minority- and women-owned firms on ADOT transportation contracts from July 2007 through June 2013. In total, Keen Independent's utilization analysis included 2,121 contracts and totaling $4.9 billion over this time period, including FHWA-, state-, FTA- and FAA-funded contracts. Keen Independent's analysis of these contracts included more than 11,500 subcontracts.

The study team collected information about ADOT projects as well as work awarded for local agency projects that use funds administered through ADOT ("LPA" contracts). Chapter 3 and Appendix C explain the methods used to collect these data and determine the racial, ethnic and gender ownership characteristics of individual firms.

Figure 6-1.
Defining and measuring "utilization"

"Utilization" of MBE/WBEs refers to the share of prime contract and subcontract dollars that an agency awarded to MBE/WBEs during a particular time period. Keen Independent measures the utilization of all MBE/WBEs, regardless of certification. The study team reports utilization for firms owned by different racial, ethnic and gender groups.

Keen Independent measures MBE/WBE utilization as percentage of total prime contract and subcontract dollars. For example, if 5 percent of prime contract and subcontract dollars went to WBEs during the study period, WBE utilization would be 5 percent.

Information about MBE/WBE utilization is instructive on its own, but it is even more useful when it is compared with the utilization that might be expected based on the availability of MBE/WBEs for ADOT work. The study team presents such comparisons as part of the "disparity analysis" later in Chapter 6.

Note that ADOT awards work through a variety of contract agreements; to simplify, the utilization analysis refers to all such work as "contracts."[1]

[1] Also, prime contractors, not ADOT or local agencies, "award" subcontracts to subcontractors. To streamline the discussion, ADOT and local agency "award" of contract elements is used here and throughout the report.

Calculation of "utilization." The study team measured MBE/WBE "utilization" as the percentage of prime contract and subcontract dollars awarded to MBE/WBEs during the study period (see Figure 6-1). Keen Independent calculated MBE/WBE utilization for a group of contracts by dividing the contract dollars going to MBE/WBEs by the contract dollars for all firms.

To avoid double-counting contract dollars and better gauging utilization of different types of firms, Keen Independent based the utilization of prime contractors in the amount of the contract retained by the prime after deducting subcontract amounts. In other words, a $1 million contract that involved $400,000 in subcontracting only counts as $600,000 to the prime contractor in the utilization analysis.

Different results than in ADOT Uniform Reports of DBE Commitments/Awards and Payments. USDOT requires agencies such as ADOT to submit reports about its DBE utilization on its FHWA-funded transportation contracts twice each year (typically in April and October).

Keen Independent's analysis of MBE/WBE utilization goes beyond what ADOT currently reports to the FHWA, FTA and FAA as explained below.

- All MBE/WBEs, not just certified DBEs. Per USDOT regulations, ADOT's Uniform Reports focus exclusively on certified DBEs.

  Keen Independent's utilization analyses examines the utilization of minority- and women-owned firms — not just the utilization of certified DBEs. The study team's analysis includes the utilization of MBE/WBEs that may have once been DBE-certified and graduated (or let their certifications lapse) and the utilization of MBE/WBEs that have never been DBE-certified. (Keen Independent separately reports utilization of MBE/WBEs that were DBE-certified during the study period.[2])

- All transportation contracts, not just USDOT-funded contracts. Because USDOT requires ADOT to prepare DBE utilization reports on its USDOT-funded transportation contracts, ADOT's Uniform Reports do not include state-funded contracts.

- More complete contract information. Through ADOT's assistance during the disparity study, and as part of ADOT's ongoing improvements to its contract data collection and reporting, the study team was able to analyze more complete data than ADOT had in its Uniform Reports, especially in earlier part of the study period.

As a result, Keen Independent's estimates of DBE participation on FHWA-, FTA and FAA-funded contracts during the study period differ from the overall DBE participation ADOT reported to FHWA, FTA and FAA over a similar time period. (Keen Independent's estimate of percentage DBE participation is usually higher than what ADOT had reported.)

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[2] Although businesses that are owned and operated by socially- and economically-disadvantaged white men can become certified as DBEs, Keen Independent identified no DBE-certified white male-owned businesses that ADOT utilized during the study period. In other words, all DBEs that ADOT utilized during the study period were MBE/WBEs. Thus, utilization results for certified DBEs are a subset of the utilization results for all MBE/WBEs.

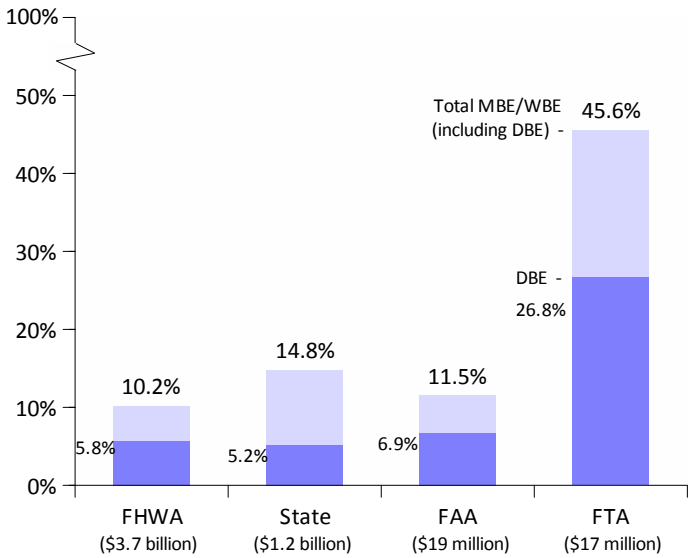
B. Overall MBE/WBE and DBE Utilization on ADOT Contracts

Figure 6-2 presents overall MBE/WBE utilization (as a percentage of total dollars) on ADOT transportation-related contracts awarded during the study period. Results are for the 13,667 prime contracts and subcontracts for FHWA-, state-, FAA- and FTA-funded contracts. The darker portion of the bar presents the utilization of MBE/WBEs that were DBE-certified.

Figure 6-2.
MBE/WBE and DBE share of prime contract/subcontract dollars for ADOT/LPA FHWA-, state-, FAA- and FTA-funded transportation contracts, July 2007-June 2013

Note:
Dark portion of bar is certified DBE utilization.
Number of contracts/subcontracts analyzed is 13,667.

Source:
Keen Independent from data on ADOT and LPA contracts July 2007-June 2013.



FHWA-funded contracts. Keen Independent examined 11,348 FHWA-funded prime contracts and subcontracts from July 2007 through June 2013. In total, there was $3.7 billion in contract dollars for these contracts.[3] FHWA-funded contracts were the largest segment of ADOT contracts included in the study.

MBE/WBEs received $373 million, or 10.2 percent of ADOT FHWA-funded contract dollars during study period. About $212 million (5.8%) of contract dollars went to MBE/WBEs that were DBE-certified during that time period.[4] Minority- and women-owned firms not certified as DBEs accounted for $161 million or 4.4 percentage points of the total 10.2 percent MBE/WBE participation. Note that ADOT set DBE contract goals on some FHWA-funded projects during the last three years of the study period.

Keen Independent was able to capture information about more FHWA-funded contracts, subcontracts and contract dollars than ADOT included in its Uniform Reports of DBE Commitments/Awards and Payments for this time period. ADOT reported $2.5 billion in FHWA-funded contracts from October 2007 through September 2013, of which $100 million went to DBEs.

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[3] Note that because ADOT and USDOT treat each contract with any FHWA dollars as "FHWA-funded," the study team did so as well (some of the funding on these contracts was state dollars).

[4] DBE certified for at least some portion of the study period. Does not include firms first certified as DBEs after June 2013.

(These results are for contract and subcontract awards.) Based on ADOT reports, DBEs received 3.9 percent of total FHWA-funded contract dollars.

State-funded contracts. The study team obtained data on 2,158 state-funded transportation construction and engineering-related prime contracts and subcontracts for July 2007 through June 2013. These contracts totaled $1.2 billion, about one quarter of the total dollars examined in the utilization analysis.

Minority- and women-owned firms received 14.8 percent of the contract dollars for state-funded transportation contracts during the study period. Compared with FHWA-funded contracts, less of this utilization (5.2%) was DBE participation (see Figure 6-2).

ADOT does not prepare DBE utilization reports for state-funded contracts.

FAA-funded contracts. The study team identified 18 FAA-funded contracts during the study period totaling $19 million. MBE/WBEs obtained 11.5 percent of these contract dollars, of which 6.9 percentage points went to DBEs.

The contract data the study team collected appears more comprehensive than what ADOT may have had for previous reports to FAA. The study team examined hard copy contract records at Grand Canyon National Park Airport, and performed the utilization analysis based on this primary data collection. ADOT also provided the study team Uniform Reports for FAA-funded contracts for FFY 2011 through FFY 2013. These Uniform Reports indicated $1.7 million in total FAA-funded contracts in these years and no participation of certified DBEs (no awards and no payments).

FTA-funded contracts. Keen Independent identified $17 million in FTA-funded contracts for the study period (139 prime contracts and subcontracts). These include $5.8 million in transit services contracts and $5.9 million in transportation planning contracts. MBE/WBE and DBE participation on these contracts was considerably higher than other contracts examined in this study. Almost one-half of the contract dollars went to minority- and women-owned firms. DBE participation was 26.9 percent (but not because of DBE contract goals as ADOT operated a neutral program for its FTA-funded contracts).

ADOT provided the study team FFY 2009 through FFY 2013 Uniform Reports for FTA-funded contracts that indicated about $13 million in contracts and 11.5 percent DBE participation (based on awards).

C. Utilization by Racial, Ethnic and Gender Group

Figure 6-3 presents detailed information for minority- and women-owned firms (top portion of the table) and certified DBEs (bottom portion of the table) for FHWA- and for state-funded contracts. For each of these two sets of contracts, Figure 6-3 shows:

- Total number of prime contracts and subcontracts awarded to the group (e.g. 67 FHWA-funded prime contracts and subcontracts to African American-owned firms);
- Combined dollars of prime contracts going to the group (e.g., $10,749,000 to African American-owned firms); and

- The percentage of combined contract dollars for the group (e.g., African American-owned firms received 0.3 percent of total FHWA-funded contract dollars).

FHWA-funded contracts. As shown in the top portion of Figure 6-3 for FHWA-funded contracts, white women-owned firms (WBEs) received the largest number of prime contracts and subcontracts (1,832), the most dollars ($190,868,000) and the highest share of dollars (5.2%) out of all MBE/WBE groups. Among minority-owned firms, Hispanic American-owned firms received the most prime contracts and subcontracts and the most dollars of FHWA-funded contracts.

The bottom portion of Figure 6-3 indicates that DBEs owned by white women, Hispanic Americans and Native Americans accounted for nearly all of the DBE participation on FHWA-funded contracts. In total, DBEs received 1,625 prime contracts and subcontracts and $212 million of FHWA-funded contracts during the study period. This accounted for 5.8 percent of FHWA-funded contract dollars.

Figure 6-3.
MBE/WBE and DBE share of ADOT/LPA prime contracts and subcontracts for FHWA- and state-funded contracts, July 2007-June 2013

	FHWA			State		
	Number of contracts*	$1,000s	Percent of dollars	Number of contracts*	$1,000s	Percent of dollars
MBE/WBEs						
African American-owned	67	$ 10,749	0.3 %	7	$ 9,185	0.7 %
Asian-Pacific American-owned	36	4,449	0.1	5	1,194	0.1
Subcontinent Asian American-owned	137	13,471	0.4	21	5,373	0.4
Hispanic American-owned	1,039	103,440	2.8	145	57,882	4.7
Native American-owned	152	50,093	1.4	23	8,358	0.7
WBE (white women-owned)	1,832	190,868	5.2	312	101,803	8.2
Total MBE/WBE	**3,263**	$ **373,071**	**10.2** %	**513**	$ **183,796**	**14.8** %
Majority-owned	8,085	3,299,188	89.8	1,645	1,054,616	85.2
Total	**11,348**	$ **3,672,259**	**100.0** %	**2,158**	$ **1,238,412**	**100.0** %
DBEs						
African American-owned	31	$ 1,333	0.0 %	2	$ 189	0.0 %
Asian-Pacific American-owned	9	3,617	0.1	1	1,096	0.1
Subcontinent Asian American-owned	118	13,160	0.4	20	5,343	0.4
Hispanic American-owned	626	70,360	1.9	95	32,495	2.6
Native American-owned	125	49,722	1.4	16	4,873	0.4
WBE (white women-owned)	716	73,853	2.0	112	19,840	1.6
White male-owned DBE	0	0	0.0	0	0	0.0
Total DBE	**1,625**	$ **212,044**	**5.8** %	**246**	$ **63,837**	**5.2** %
Non-DBE	9,723	3,460,215	94.2	1,912	1,174,575	94.8
Total	**11,348**	$ **3,672,259**	**100.0** %	**2,158**	$ **1,238,412**	**100.0** %

Note: *Number of prime contracts and subcontracts.
Numbers rounded to nearest tenth of 1 percent. Numbers may not add to totals due to rounding.
Includes $74 million for Coffman Specialties.

Source: Keen Independent from data on ADOT and LPA contracts July 2007-June 2013.

State-funded contracts. Figure 6-3 also shows participation of MBE/WBEs on state-funded contracts. As with FHWA-funded contracts, white women-owned firms (8.2%) and Hispanic American-owned firms (4.7%) accounted for most of the total participation of MBE/WBEs on state-funded contracts. Even though DBE contract goals were not applied, DBEs did participate in state-funded contracts, receiving about 5.2 percent of total contract dollars (see the bottom portion of Figure 6-3).

FHWA- and state-funded contracts combined. Because of the similarities of FHWA- and state-funded contracts, Keen Independent also examined MBE/WBE and DBE participation on these contracts combined. Figure 6-4 presents these results.

As with the separate utilization results for FHWA- and state-funded contracts, white women-owned firms represented the largest share of contract dollars going to MBE/WBEs for FHWA- and state-funded contracts combined (6.0%). White women-owned firms certified as DBEs received 1.9 percent of combined contract dollars with the balance going to white women-owned firms not DBE-certified in the study period.

Much of this non-DBE participation of white women-owned firms on both FHWA- and state-funded contracts was one company — Coffman Specialties, a large general contractor based in San Diego. This company received more ADOT work than any other MBE/WBE: $74 million during the study period. Coffman Specialties appears to have once been WBE-certified in California in the 1990s, but according to ADOT and FHWA staff, was denied DBE certification in Arizona within the past 15 years due to issues concerning ownership and control of the firm. Therefore, it might be appropriate to examine utilization without this company included as a WBE.

Without Coffman Specialties, WBE utilization would be 4.5 percent of total FHWA- and state-funded contract dollars. (Throughout the utilization and disparity analysis, Keen Independent examines overall results for WBEs with and without Coffman Specialties counted as a WBE.)

Figure 6-4.
MBE/WBE and DBE share of ADOT/LPA prime contracts and subcontracts for combined FHWA- and state-funded contracts, July 2007-June 2013

	Total FHWA and State		
	Number of contracts*	$1,000s	Percent of dollars
MBE/WBEs			
African American-owned	74	$ 19,933	0.4 %
Asian-Pacific American-owned	41	5,644	0.1
Subcontinent Asian American-owned	158	18,844	0.4
Hispanic American-owned	1184	161,322	3.3
Native American-owned	175	58,452	1.2
WBE (white women-owned)	2,144	292,672	6.0
Total MBE/WBE	**3,776**	$ **556,867**	**11.3** %
Majority-owned	9,730	4,353,804	88.7
Total	**13,506**	$ **4,910,671**	**100.0** %
DBEs			
African American-owned	33	$ 1,522	0.0 %
Asian-Pacific American-owned	10	4,714	0.1
Subcontinent Asian American-owned	138	18,503	0.4
Hispanic American-owned	721	102,855	2.1
Native American-owned	141	54,595	1.1
WBE (white women-owned)	828	93,693	1.9
White male-owned DBE	0	0	0.0
Total DBE	**1,871**	$ **275,881**	**5.6** %
Non-DBE	9,477	4,634,790	94.4
Total	**11,348**	$ **4,910,671**	**100.0** %

Note: *Number of prime contracts and subcontracts.
Numbers rounded to nearest tenth of 1 percent. Numbers may not add to totals due to rounding.
Includes $74 million for Coffman Specialties.

Source: Keen Independent from data on ADOT and LPA contracts July 2007-June 2013.

FAA-funded contracts. Keen Independent examined 18 FAA-funded contracts at Grand Canyon National Park Airport. Figure 6-5 includes results for those FAA-funded contracts. Two contracts to white women-owned firms and one contract to a Hispanic American-owned business accounted for all of the MBE/WBE participation for FAA-funded contracts. MBE utilization was 4.6 percent and WBE utilization was 6.9 percent of FAA-funded contract dollars during the study period.

FTA-funded contracts. MBE/WBEs were awarded 41 of the 139 FTA-funded prime contracts and subcontracts. White women-owned firms obtained 30 percent of total FTA-funded contract dollars, and MBEs received about 15 percent.

Figure 6-5.
MBE/WBE and DBE share of ADOT/LPA prime contract and subcontract dollars for FAA- and FTA-funded contracts, July 2007-June 2013

	FAA			FTA		
	Number of contracts*	$1,000s	Percent of dollars	Number of contracts*	$1,000s	Percent of dollars
MBE/WBEs						
African American-owned	0	$ 0	0.0 %	4	$ 612	3.6 %
Asian-Pacific American-owned	0	0	0.0	4	1,018	6.0
Subcontinent Asian American-owned	0	0	0.0	3	48	0.3
Hispanic American-owned	1	887	4.6	6	83	0.5
Native American-owned	0	0	0.0	4	840	4.9
WBE (white women-owned)	2	1,327	6.9	20	5,215	30.4
Total MBE/WBE	**3**	**$ 2,214**	**11.5 %**	**41**	**$ 7,816**	**45.7 %**
Majority-owned	12	17,056	88.5	98	9,244	54.3
Total	**18**	**$ 19,270**	**100.0 %**	**139**	**$ 17,060**	**100.0 %**
DBEs						
African American-owned	0	$ 0	0.0 %	1	$ $19	0.1 %
Asian-Pacific American-owned	0	0	0.0	0	0	0.0
Subcontinent Asian American-owned	0	0	0.0	3	48	0.3
Hispanic American-owned	0	0	0.0	4	59	0.3
Native American-owned	0	0	0.0	2	20	0.1
WBE (white women-owned)	2	1,327	6.9	14	4,449	26.1
White male-owned DBE	0	0	0.0	0	0	0.0
Total DBE	**2**	**$ 1,327**	**6.9 %**	**24**	**$ 4,595**	**26.9 %**
Non-DBE	16	17,943	93.1	139	12,465	73.1
Total	**18**	**$ 19,270**	**100.0 %**	**163**	**$ 17,060**	**100.0 %**

Note: *Number of prime contracts and subcontracts.
Numbers rounded to nearest tenth of 1 percent. Numbers may not add to totals due to rounding.

Source: Keen Independent from data on ADOT and LPA contracts July 2007-June 2013.

D. Disparity Analysis for ADOT Contracts

To conduct the disparity analysis, Keen Independent compared the actual utilization of MBE/WBEs on ADOT transportation prime contracts and subcontracts with the percentage of contract dollars that MBE/WBEs might be expected to receive based on their availability for that work. (Availability is also referred to as the "utilization benchmark.") Keen Independent made those comparisons for individual MBE/WBE groups. Chapter 5 explains how the study team developed benchmarks from the availability data.

Keen Independent expressed both utilization and availability as percentages of the total dollars associated with a particular set of contracts, making them directly comparable (e.g., 5% utilization compared with 4% availability). Keen Independent then calculated a "disparity index" to help compare utilization and availability results among MBE/WBE groups and across different sets of contracts. Figure 6-6 describes how Keen Independent calculated disparity indices.

- A disparity index of 100 indicates an exact match between actual utilization and what might be expected based on MBE/WBE availability for a specific set of contracts (often referred to as "parity").
- A disparity index of less than 100 may indicate a disparity between utilization and availability, and disparities of less than 80 in this report are described as "substantial."[5]

Figure 6-6.
Calculation of disparity indices

The disparity index provides a straightforward way of assessing how closely actual utilization of an MBE/WBE group matches what might be expected based on its availability for a specific set of contracts. With the disparity index, one can directly compare results for one group to that of another group, and across different sets of contracts. Disparity indices are calculated using the following formula:

$$\frac{\text{\% actual utilization} \times 100}{\text{\% availability}}$$

For example, if actual utilization of MBEs on a set of ADOT contracts was 2 percent and the availability of MBEs for those contracts was 4 percent, then the disparity index would be 2 percent divided by 4 percent, which would then be multiplied by 100 to equal 50. In this example, MBEs would have actually received 50 cents of every dollar that they might be expected to receive based on their availability for the work.

Results for minority-owned firms on FHWA- and state-funded contracts. Minority-owned firms received 5.4 percent of combined FHWA- and state-funded contracts, a result that was below what might be expected from the availability analysis — 9.6 percent. Figure 6-7 shows these results.

[5] Some courts deem a disparity index below 80 as being "substantial" and have accepted it as evidence of adverse impacts against MBE/WBEs. For example, see *Associated General Contractors of America, San Diego Chapter, Inc. v. California Department of Transportation, et al.*, __ F. 3d __, 2013 WL 1607239 (9th Cir. April 16, 2013).; *Rothe Development Corp v. U.S. Dept of Defense*, 545 F.3d 1023, 1041; *Eng'g Contractors Ass'n of South Florida, Inc. v. Metropolitan Dade County*, 122 F.3d at 914, 923 (11th Circuit 1997); *Concrete Works of Colo., Inc. v. City and County of Denver*, 36 F.3d 1513, 1524 (10th Cir. 1994). Also see Appendix B for additional discussion.

The resulting disparity index is 56 (5.4% divided by 9.6% times 100), which is a substantial disparity. The disparity occurred even with application of DBE contract goals on some FHWA-funded contracts in recent years.

Figure 6-7.
MBE utilization and availability for FHWA- and state-funded contracts,
July 2007-June 2013

Note:
Number of contracts/subcontracts analyzed is 13,506.

Source:
Keen Independent disparity analysis.

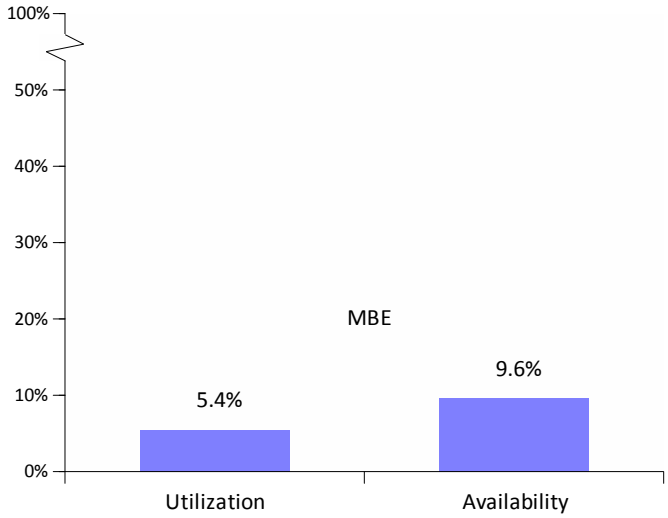
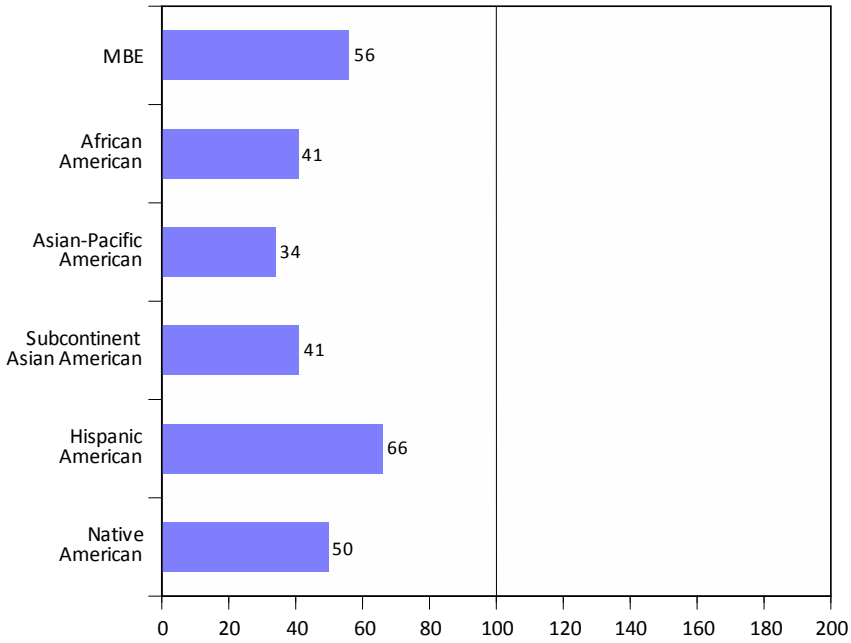


Figure 6-8 shows disparity indices in the range of 34 to 66 for African American-, Asian-Pacific American-, Subcontinent Asian American-, Hispanic American- and Native American-owned firms on FHWA- and state-funded contracts combined. There was no MBE group for which utilization was on par with what might be expected from the availability analysis.

Figure 6-8.
Disparity indices for minority-owned firms, by group, for FHWA- and state-funded contracts,
July 2007-June 2013

Note:
Number of contracts/subcontracts analyzed is 13,506.

Source:
Keen Independent disparity analysis.



Results for white women-owned firms on FHWA- and state-funded contracts. WBEs received 6.0 percent of combined FHWA- and state-funded contracts when Coffman Specialties is included. This level of utilization exceeds the 4.7 percent utilization that might be expected based on the availability analysis for white women-owned firms in Arizona.

Without Coffman Specialties included as a WBE, white women-owned firms received 4.5 percent of combined FHWA- and state-funded contracts, somewhat below what might be expected from the availability analysis.

The disparity index for white women-owned firms is:

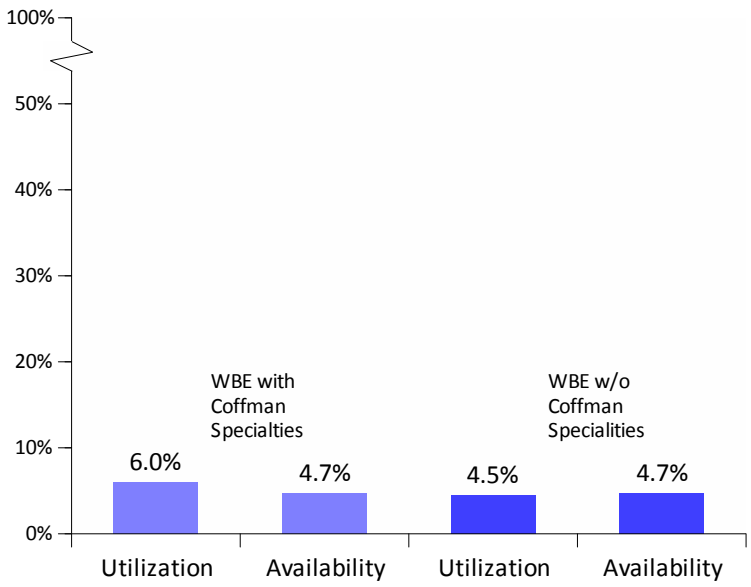
- 128 if Coffman Specialties is includes as a WBE; and
- 95 if Coffman Specialties is not included.

Figure 6-9 shows utilization and availability results for white women-owned firms. The portion on the left side of the graph examines results including Coffman Specialties as a WBE and the portion on the right side shows results without including this firm as a WBE. As with the disparity analysis for MBEs, the results in Figure 6-9 are affected by past and current application of race- and gender-conscious programs.

Figure 6-9.
MBE utilization and availability for FHWA- and state-funded contracts,
July 2007-June 2013

Note:
Number of contracts/subcontracts analyzed is 13,506.

Source:
Keen Independent disparity analysis.



Results for MBE/WBEs on FAA-funded contracts. MBEs received 4.6 percent of FAA-funded contracts, less than the 16.8 percent that might be expected based on the availability analysis for these contracts. The disparity index was 27 for MBEs overall. There were substantial disparities for each minority group (disparity index of 49 for Hispanic American-owned firms and 0 for other groups).

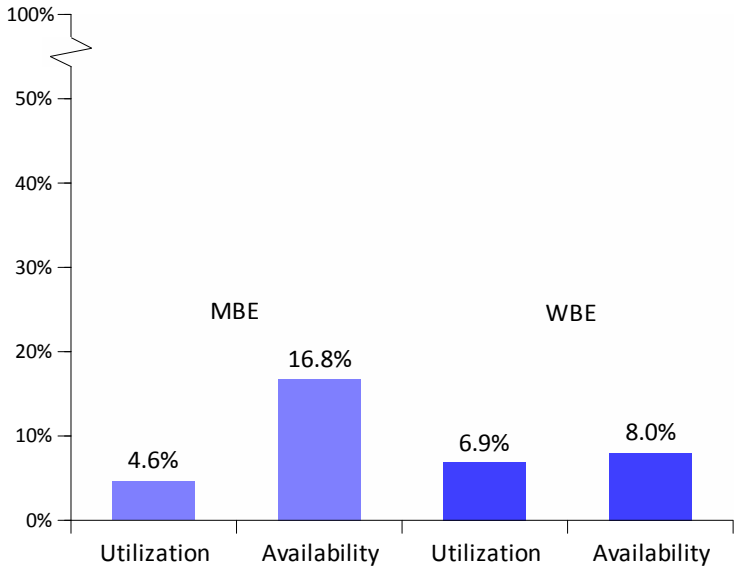
As shown in Figure 6-10, 6.9 percent of FAA-funded contract dollars went to WBEs, less than the 8.0 percent indicated from the availability analysis. This disparity index for WBEs was less than 86.

However, the utilization, availability and disparity analysis for FAA-funded contracts must be viewed with caution as there were only 18 contracts identified during the study period.

Figure 6-10.
MBE and WBE utilization and availability for FAA-funded contracts, July 2007-June 2013

Note:
Number of contracts/subcontracts analyzed is 18.

Source:
Keen Independent disparity analysis.



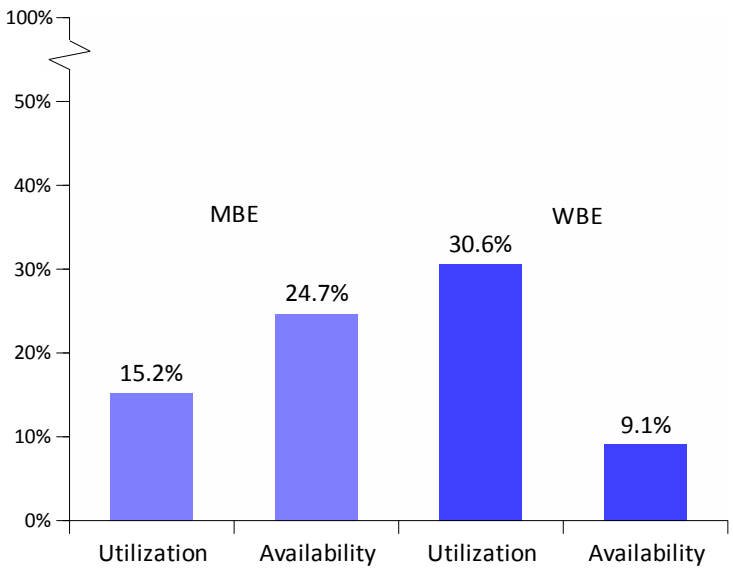
Results for MBE/WBEs on FTA-funded contracts. Although MBEs received 15.2 percent of FTA-funded contracts, this level of utilization was less than what might be expected based on the availability analysis for MBEs for these contracts (24.7%). The disparity index for MBEs was 62. Utilization exceeded availability for African American-, Asian-Pacific American- and Native American-owned firms. There were disparities for Subcontinent Asian American- and Hispanic American-owned firms.

White women-owned firms received 30.6 percent of contract dollars, higher than the 9.1 percent that might be expected based on the availability analysis for FTA-funded contracts. Figure 6-11 presents overall utilization and availability results for MBEs and WBEs in FTA-funded contracts.

Figure 6-11.
MBE and WBE utilization and availability for FTA-funded contracts, July 2007-June 2013

Note:
Number of contracts/subcontracts analyzed is 139.

Source:
Keen Independent disparity analysis.



E. Statistical Significance of Disparity Analysis Results

Testing for statistical significance relates to testing the degree to which a researcher can reject "random chance" as an explanation for any observed differences. Random chance in data sampling is the factor that researchers consider most in determining the statistical significance of results. However, the study team attempted to contact every firm in the relevant geographic market area identified as possibly doing business within relevant subindustries (as described in Chapter 5), mitigating many of the concerns associated with random chance in data sampling as they may relate to Keen Independent's availability analysis. The utilization analysis also approaches a "population" of contracts. Therefore, one might consider any disparity identified when comparing overall utilization with availability to be "statistically significant."

Figure 6-12 explains the high level of statistical confidence in the utilization and availability results. As outlined on the next page, the study team also used a sophisticated statistical simulation tool to further examine statistical significance of disparity results.

Figure 6-12.
Confidence intervals for availability and utilization measures

Keen Independent conducted telephone interviews with more than 5,188 business establishments — a number of completed interviews that is generally considered large enough to be treated as a "population," not a sample. However, if the results are treated as a sample, the reported 20.2 percent representation of MBEs among all available firms is accurate within about +/- 0.8 percentage points. The level of accuracy for WBEs is similar (+/- 0.7 of the overall figure of 14.8 percent). By comparison, many survey results for proportions reported in the popular press are accurate within +/- 5 percentage points. (Keen Independent applied a 95 percent confidence level and the finite population correction factor when determining these confidence intervals.)

Keen Independent attempted to collect data for all relevant ADOT and LPA Program transportation construction and engineering-related contracts during the study period and no confidence interval calculation applies for the utilization results.

Monte Carlo analysis. There were many opportunities in the sets of prime contracts and subcontracts for MBE/WBEs to be awarded work. Some contract elements involved large dollar amounts and others involved only a few thousand dollars.

Monte Carlo analysis was a useful tool for the study team to use for statistical significance testing in the disparity study, because there were many individual chances at winning ADOT and local agency transportation prime contracts and subcontracts during the study period, each with a different payoff. Figure 6-13 describes Keen Independent's use of Monte Carlo analysis.

Results. Keen Independent identified a substantial disparity between MBE utilization and availability across FHWA- and state-funded contracts for the July 2007 through June 2013 study period. Therefore, the Monte Carlo simulation focused on these results.

Figure 6-14 presents the results from the Monte Carlo analysis as they relate to the statistical significance of disparity analysis results for MBEs for FHWA- and state-funded contracts combined.

Figure 6-13.
Monte Carlo analysis

The study team began the Monte Carlo analysis by examining individual contract elements. For each contract element, Keen Independent's availability database provided information on individual businesses that were available for that contract element, based on type of work, contractor role, contract size and location of the work.

The study team assumed that each available firm had an equal chance of "receiving" that contract element. For example, the odds of an MBE receiving that contract element were equal to the number of MBEs available for the contract element divided by the total number of firms available for the work. The Monte Carlo simulation then randomly chose a business from the pool of available businesses to "receive" that contract element.

The Monte Carlo simulation repeated the above process for all other elements in a particular set of contracts. The output of a single Monte Carlo simulation for all contract elements in the set represented simulated utilization of MBEs for that set of contract elements.

The entire Monte Carlo simulation was then repeated 20,000 times. The combined output from all 20,000 simulations represented a probability distribution of the overall utilization of MBEs if contracts were awarded randomly based on the availability of businesses working in the Arizona transportation contracting industry.

The Monte Carlo simulations did not replicate the disparities for MBEs in any of the 20,000 simulation runs. Therefore, one can be confident that chance in contract and subcontract award can be rejected as an explanation for the observed disparity for minority-owned businesses in FHWA- and state-funded contracts.

Figure 6-14.
Monte Carlo results for MBEs for FHWA- and state-funded contracts July 2007-June 2013

Source:
Keen Independent from data on FHWA- and state-funded contracts, July 2007-June 2013.

	MBE
Disparity index	56
Number of simulation runs out of 20,000 that replicated observed utilization	0
Probablity of observed disparity occurring due to "chance"	<0.1 %
Reject chance in awards of contracts as a cause of disparity for MBEs?	Yes

It is important to note that this test may not be necessary to establish statistical significance of results (see discussion in Figure 6-12 and elsewhere in this Chapter), and it may not be appropriate for very small populations of firms.[6]

[6] Even if there were zero utilization of a particular group, Monte Carlo simulation might not reject chance in contract awards as an explanation for that result if there were a small number of firms in that group or a small number of contract elements included in the analysis. Results can also be affected by the size distribution of contract elements.